Department of
Environment &
Conservation

Tennessee Air Quality Update

Environmental Show of the South

May 2018

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Topics Covered

- **APC Mission Statement**
- **National Ambient Air Quality Standards – Where Does Tennessee Stand**
- **How Did We Get Here**
- **The Future**
- **Questions??**

Tennessee DAPC Mission Statement

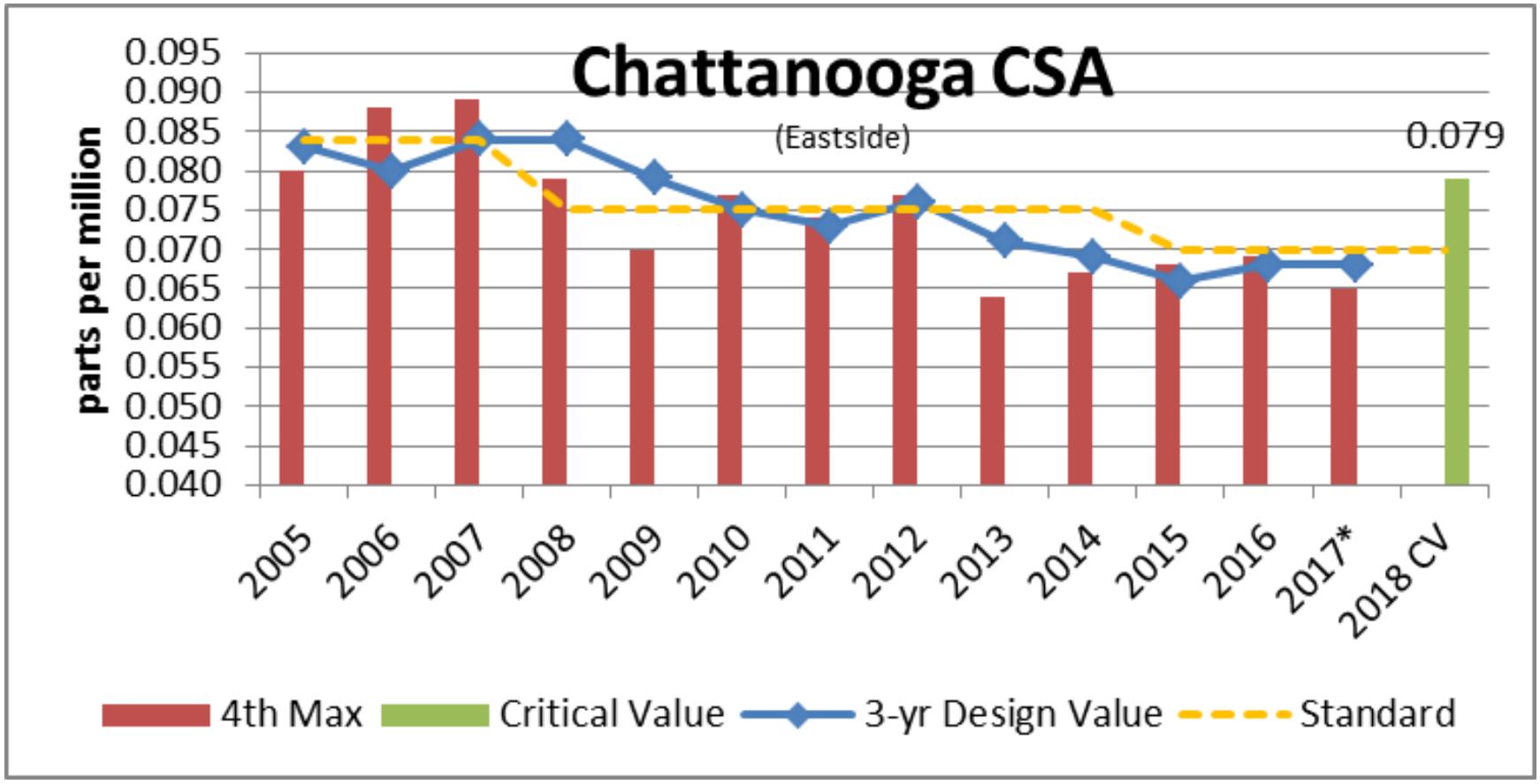
The Division of Air Pollution Control's mission is to maintain and improve air quality, to protect the health and welfare of Tennesseans through monitoring, regulatory activities and education in a manner that promotes maximum employment and economic growth.

National Ambient Air Quality Standards – Where Does Tennessee Stand

2015 Ozone Standard

- Ozone - Colorless, odorless gas that is formed in the atmosphere as the result of man-made pollution
- Standard is based on an 8-hour average and was set in 1997 at 84 ppb, lowered to 75 ppb in 2008. October 1, 2015 – EPA lowered the standard from 75 to 70 parts per billion
- **October 1, 2016** – States submit designation recommendations based on 2013-2015 design values
- **November 6, 2017** – EPA designated areas based on 2014-2016 design values.
- **All locations in Tennessee were designated attainment.**

Ozone Trends & Critical Values



*2017 data is preliminary and unofficial

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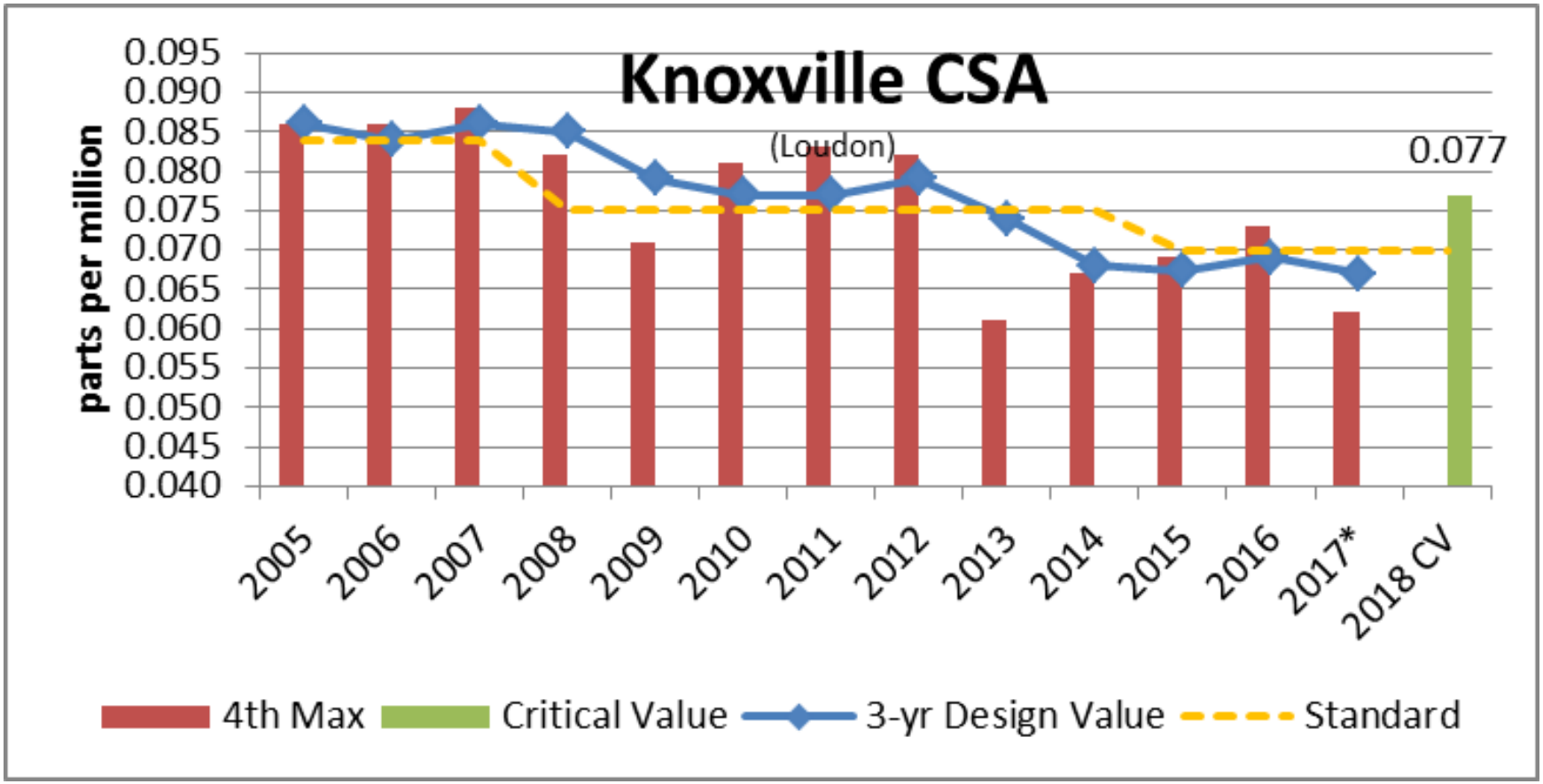

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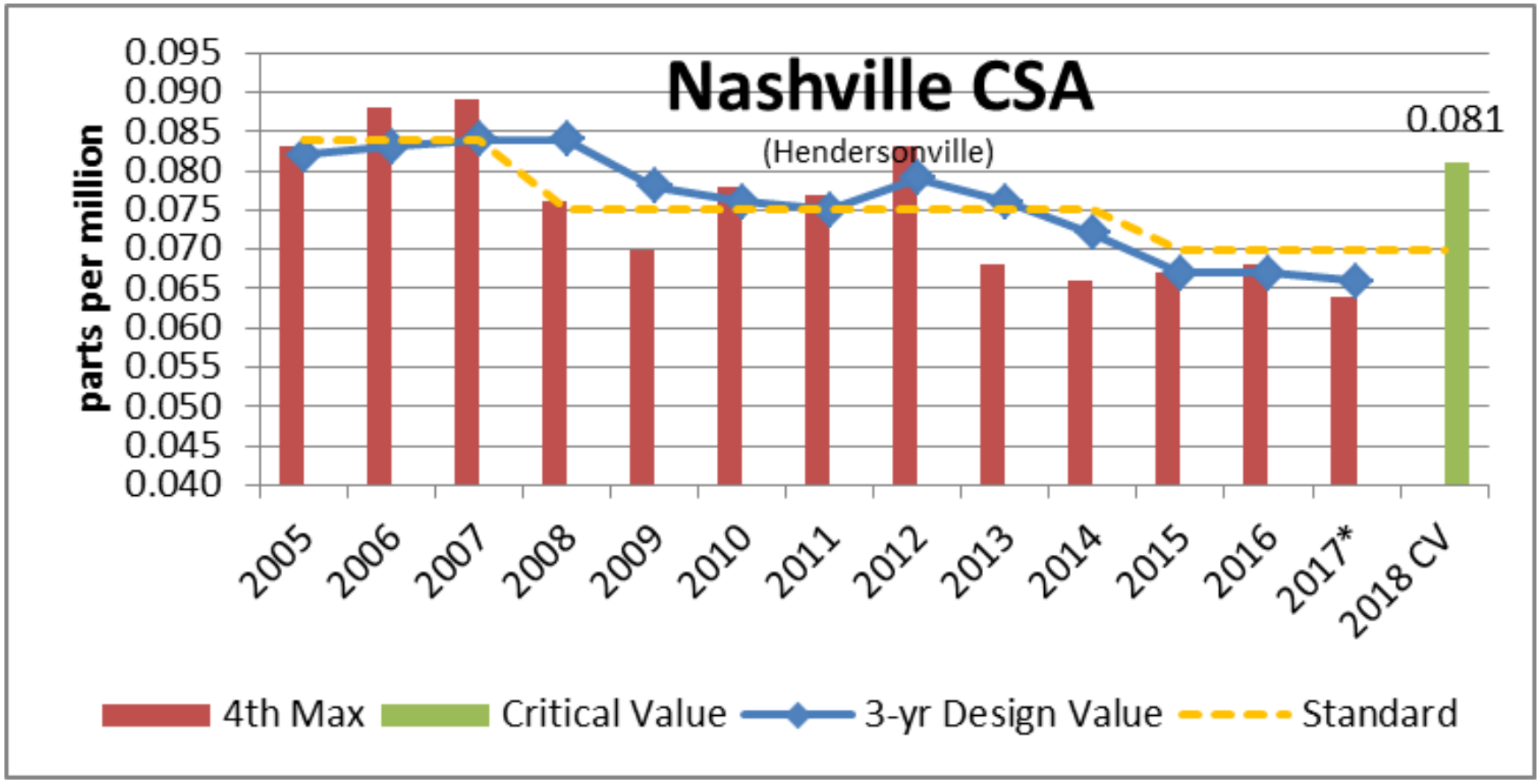

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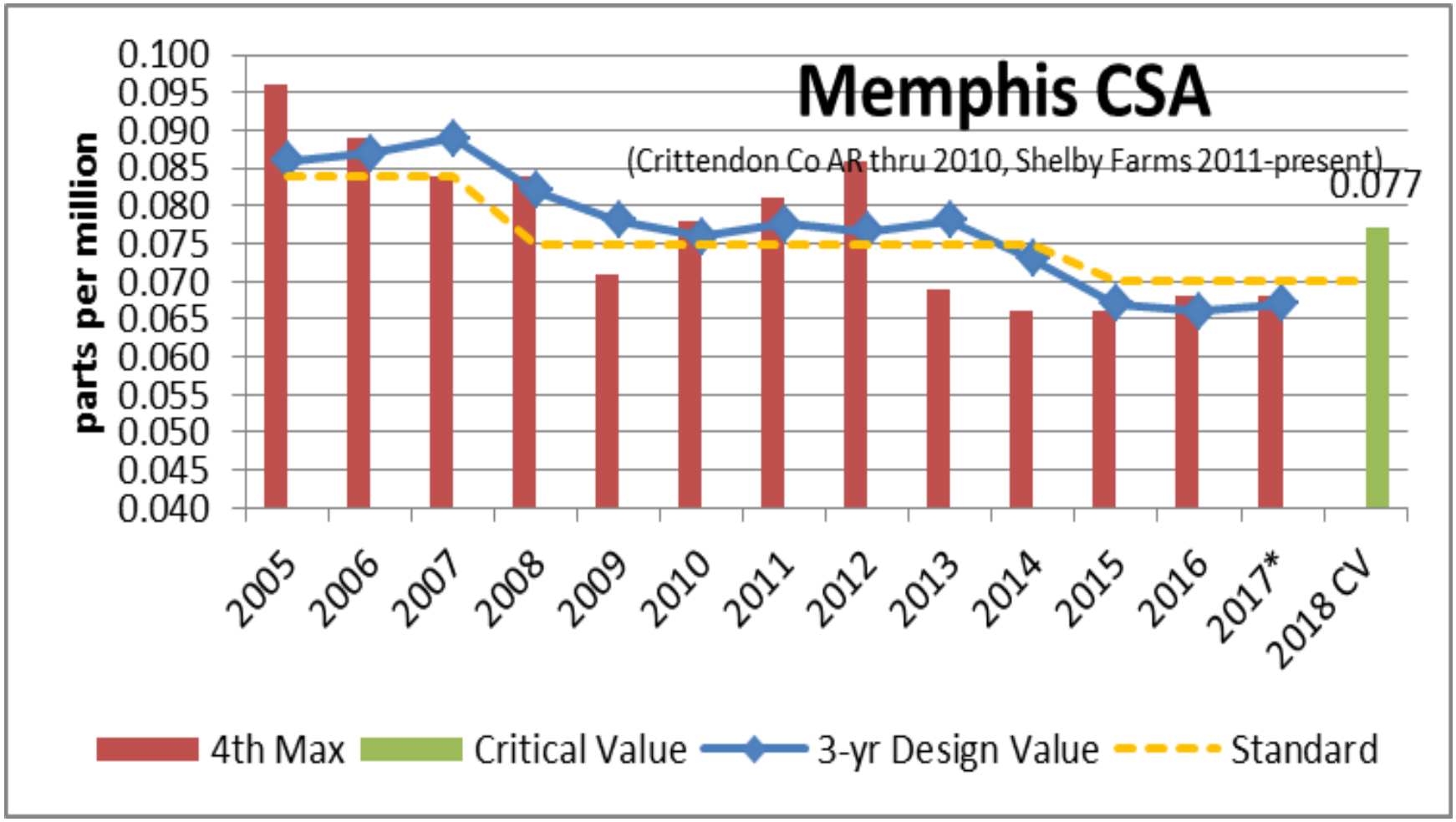

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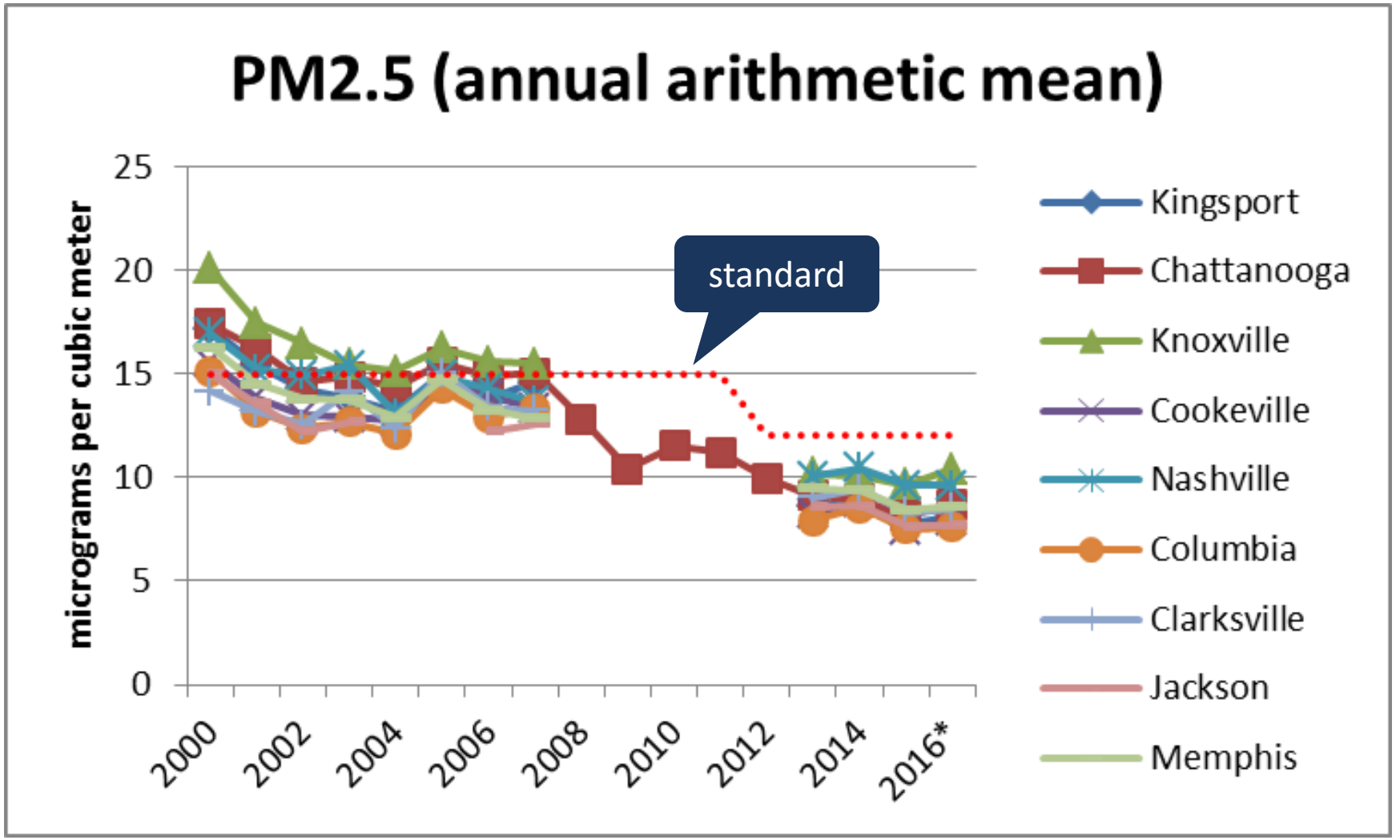
PM 2.5

Fine particles of microscopic solids or liquid droplets that can get deep into the lungs and cause serious health problems.

- premature death,
- irregular heartbeat,
- aggravated asthma,
- decreased lung function, and
- increased respiratory symptoms, such as coughing or difficulty breathing.

Fine Particulate Matter ($PM_{2.5}$)



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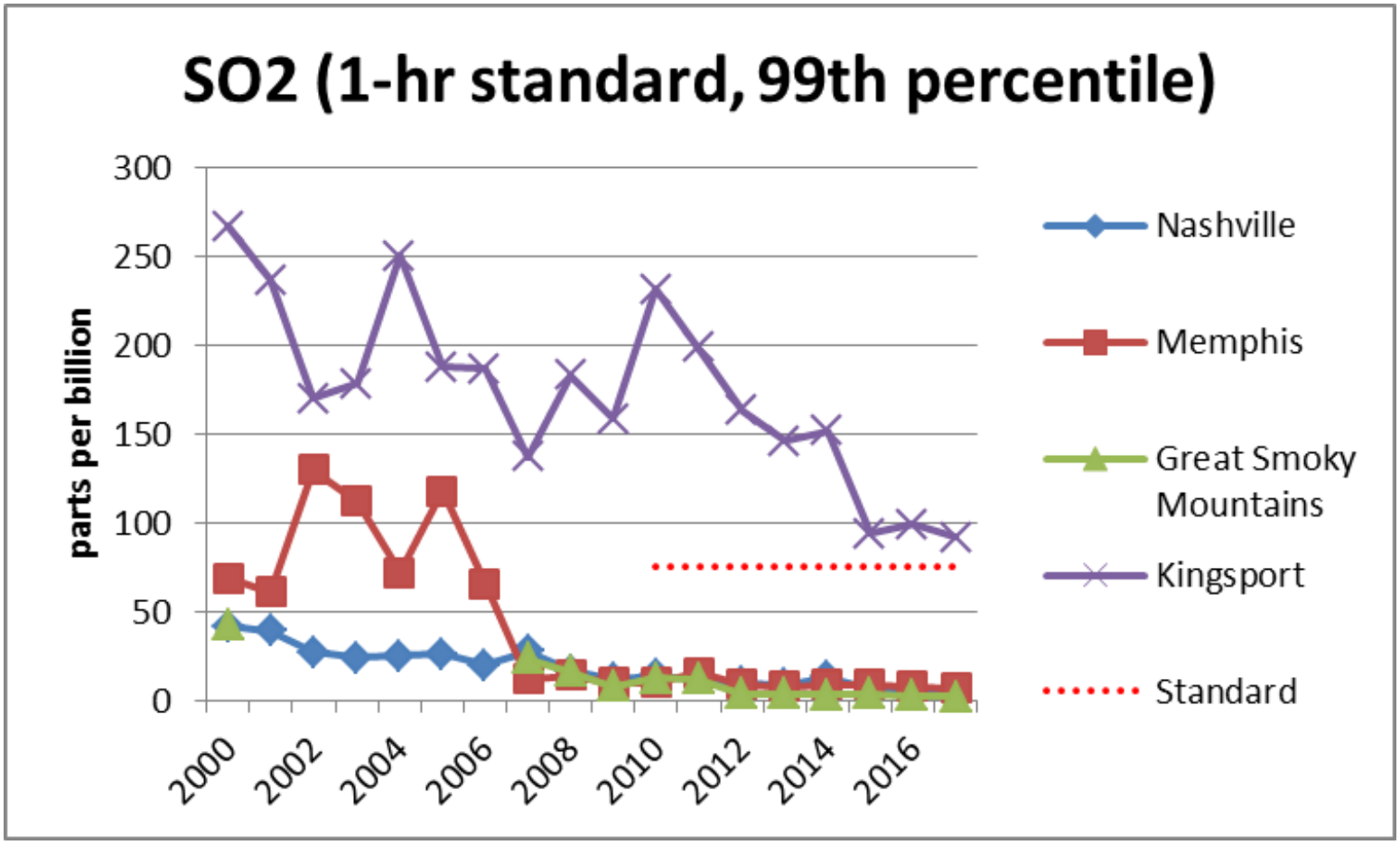
1997 & 2006 Nonattainment Area Status - Knoxville

- Attained Standards in 2013
- Maintenance Plans & Redesignation Requests Approved by Air Pollution Control Board 12/14/2016
- Submitted to US EPA for Approval 12/20/2016
- Redesignated to Attainment effective 9/27/2017

Sulfur Dioxide – SO_2

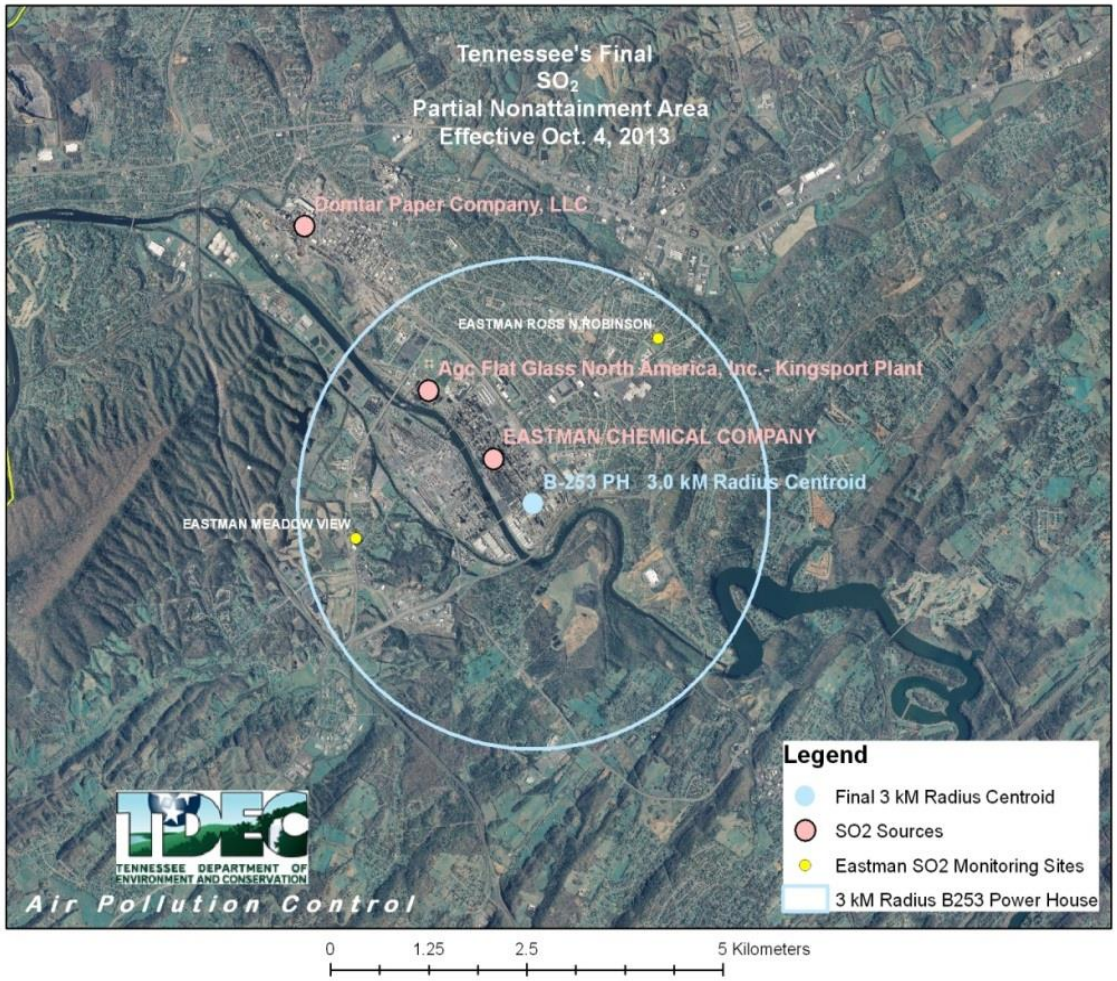
- Sulfur Dioxide forms when sulfur bearing fossil fuels are combusted.
- Sulfur Dioxide reacts with water to form sulfurous and sulfuric acid. Those acids can irritate sensitive mucous membranes and airways.
- EPA established a designation schedule for attainment of 2010 NAAQS of 75 ppm.
  - **Round 1** - Monitored Violations. October 2013
  - **Round 2** – Source with Emissions >21,000 TPY. July 2016
  - **Round 3** - Modeled Areas/no monitoring. December 2017

Sulfur Dioxide (SO_2)



Note: 2000-2015 data is industry data. 2014 & 2015 data was invalidated by EPA. 2016 is official APC data beginning July 21, 2016.

Round 1 – Kingsport Area –



- **Designated Nonattainment based on violating monitor 8/5/2013**
- **3 km radius around Eastman Chemical**
- **Attainment Plan Submitted to EPA 5/12/17**
- **Conversion of 5 coal-fired boilers to natural gas (66% SO2 reduction)**
  - 1st conversion – 2014
  - 2nd & 3rd conversions – 2016
  - 4th & 5th conversions – 2018
  - Limits on Remaining Coal-Fired Boilers

Round 2 - TVA Gallatin Plant

- Flue Gas Desulfurization installed in all four units. Completed April, 2016.

- Designated “unclassifiable”
- Modeling with new limits completed & approved by EPA

Round 3 (modeling)

TVA Cumberland
46.5 ppb

TVA Allen
66.0 ppb

TVA Johnsonville
48.7 ppb

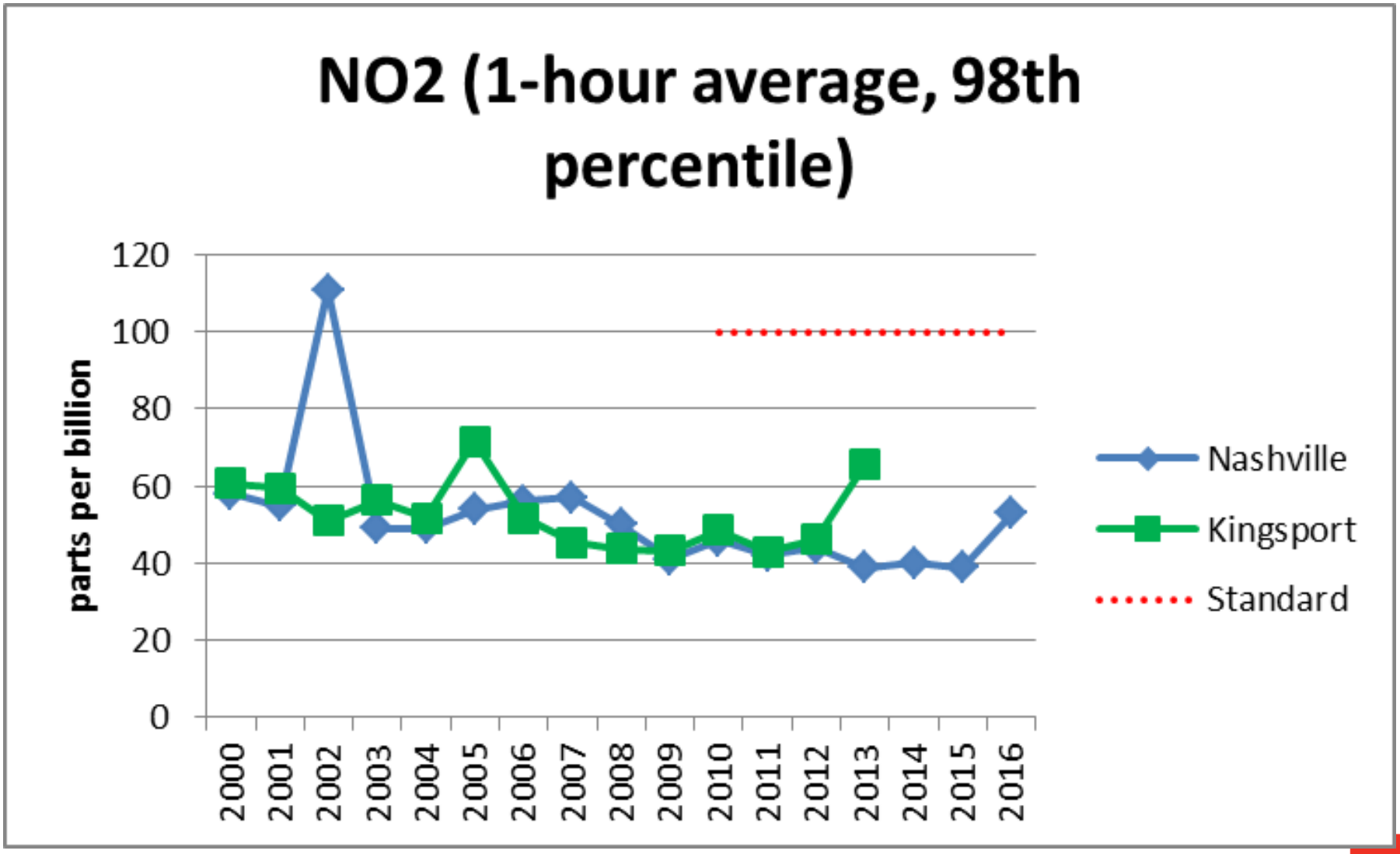
All three areas designated attainment on 12/21/2017

Nitrogen Dioxide – NO_2

- **Primary Sources of Nitrogen Oxides:**
  - Fuel Combustion in Transportation
  - Fuel Combustion in Electricity Production

- Forms when heat and pressure from combustion cause oxygen & nitrogen in the air to chemically combine.
  - a key compound in ozone formation
  - Leads to formation of HNO_3 which forms acid rain

Nitrogen Dioxide -NO_2



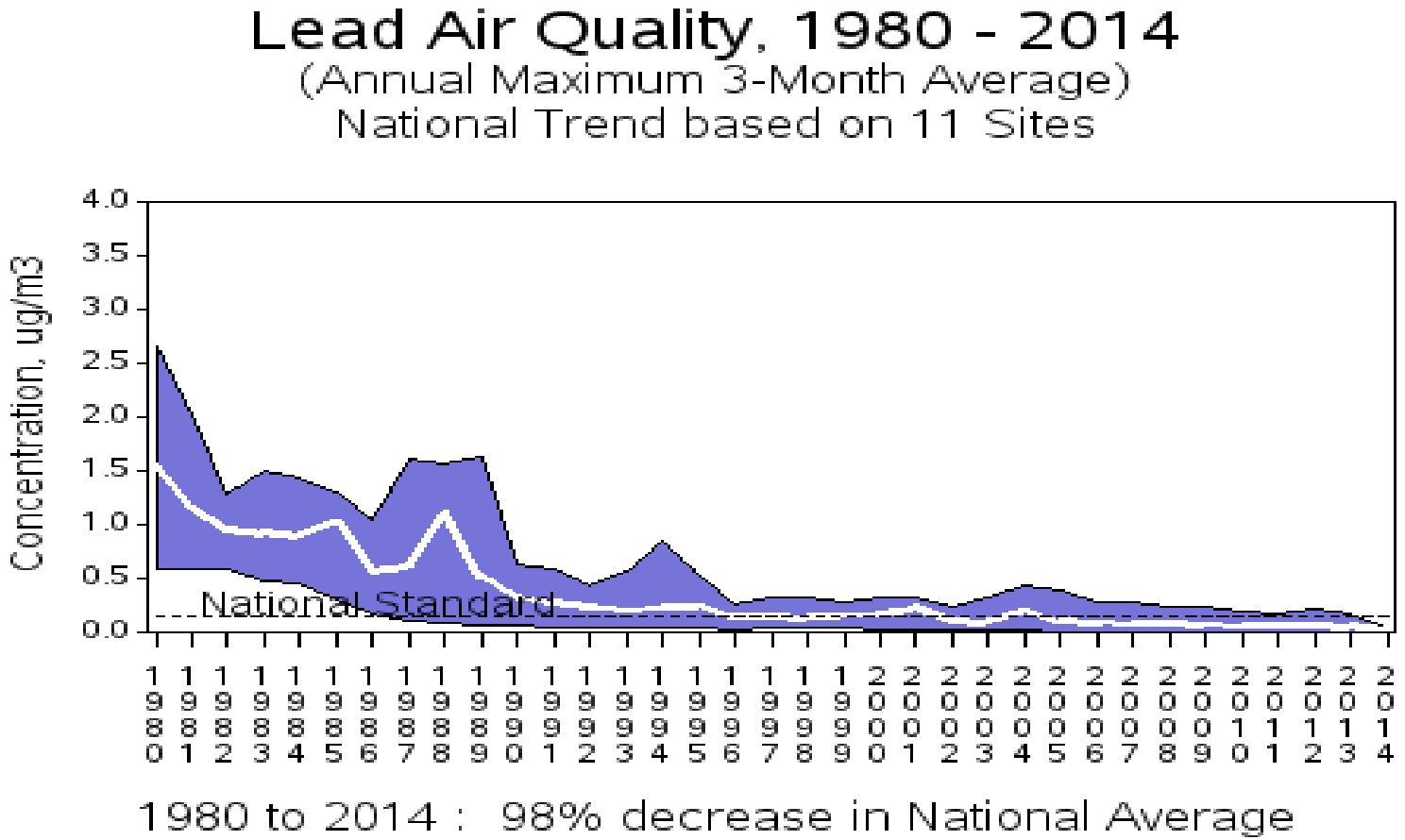
Lead NAAQS

- **Lead is a toxic metal that can cause neurological impairment in humans, particularly children.**

- Lead was a more widespread air quality issue when used as a performance additive in gasoline. Lead is now used mainly in lead acid storage batteries and in ionizing radiation shielding.

- Lead monitoring is now site-specific based on manufacturing processes. There are currently no monitors that exceedances of the lead standard in Tennessee

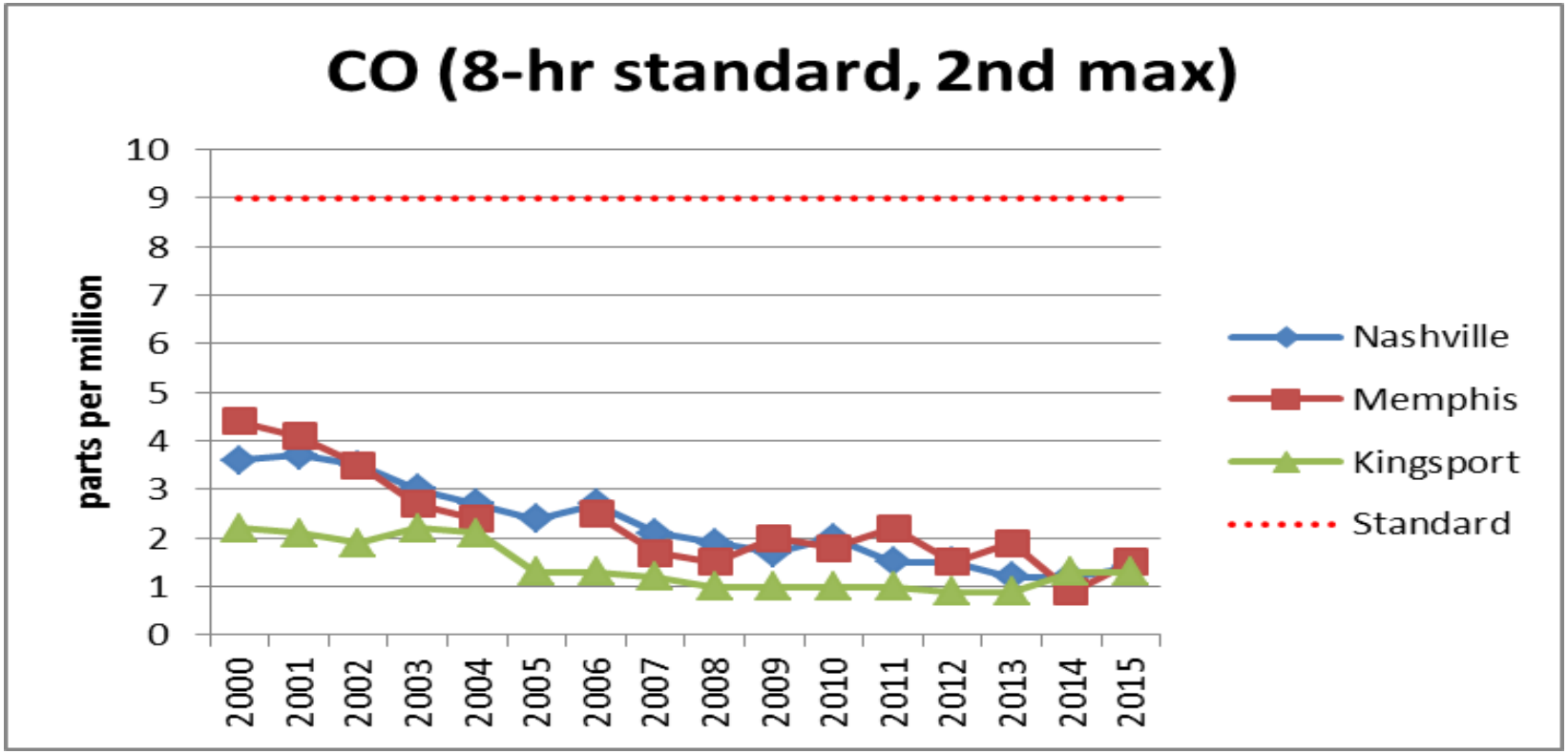
Lead



Ambient lead concentrations dropped significantly when leaded gasoline was phased out starting in the 1970's. However, in 2008, EPA lowered the ambient lead standard from 1.5 µg/m^3 to 0.15 µg/m^3.

Carbon Monoxide NAAQS

- Arises from incomplete combustion of fossil fuels.
- Chemically binds to hemoglobin, temporarily reducing oxygen carrying capacity of blood



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How Did Tennessee Achieve these Air Quality Improvements

Factors Leading to Improved Air Quality

- Strong Regulatory Presence from Local, State, and Federal Agencies.
  - TVA Settlement
  - Consistent permitting and enforcement

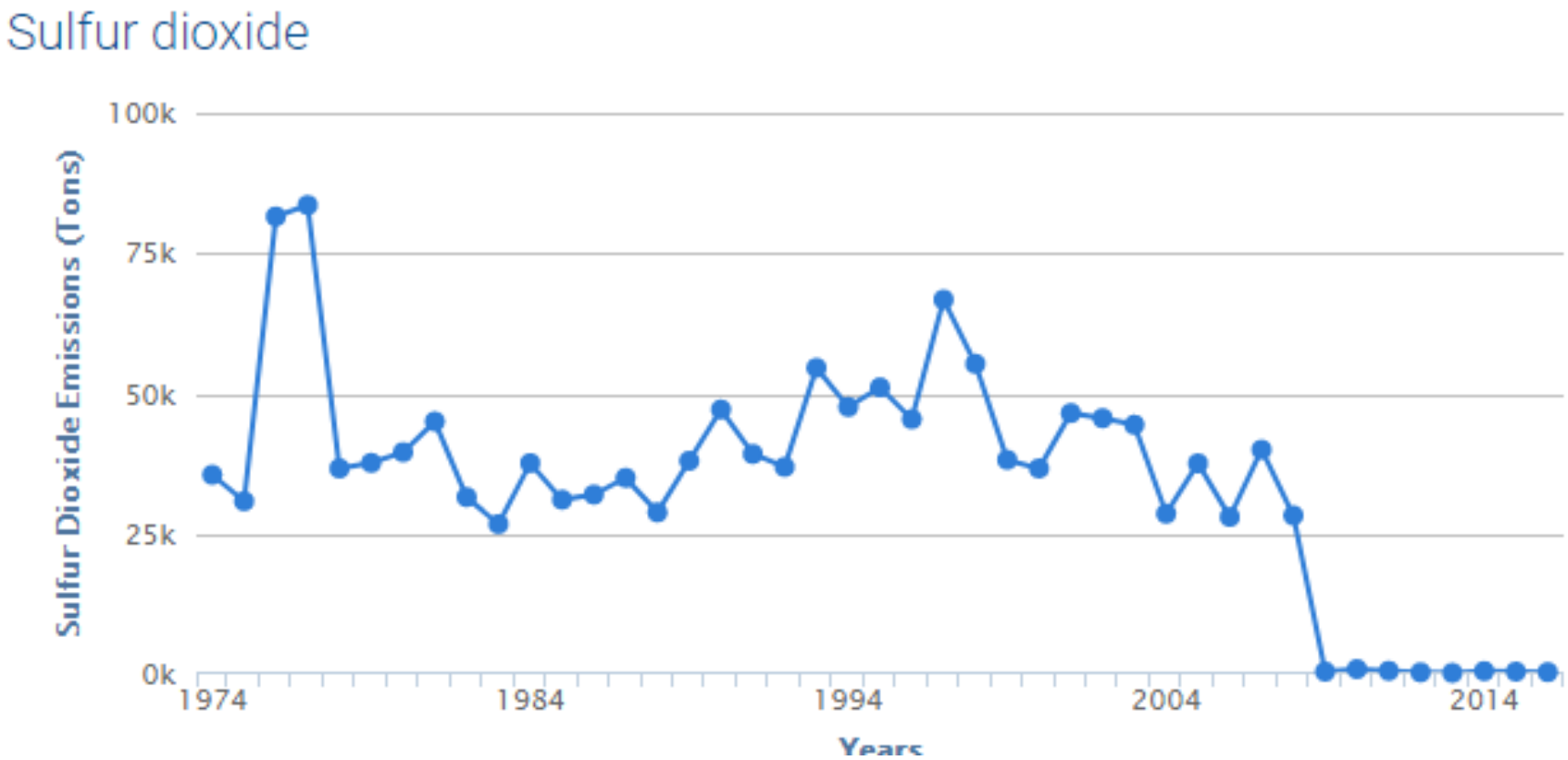
- Economic Conditions
  - Inexpensive natural gas
  - Evaluation of the cost of regulatory compliance vs upgrades
  - Reduced cost of renewable energy
- Public Understanding of Health Affects of Poor Air Quality
  - Understanding of air quality health impacts and expectation of energy efficiency are now part of decision making processes for construction projects.

TVA Actions

- **2011 TVA Consent Decree**
  - Coal plants – Closures and Upgrades
    - Johnsonville – 10 coal units retired – Last shutdown **December 2017**
    - Allen – 3 coal units retired **– April 2018**
    - John Sevier – 4 coal units retired in 2012
    - Gallatin – upgraded pollution controls
    - Cumberland – upgraded pollution controls
    - Bull Run – upgraded pollution controls
    - Kingston - upgraded pollution controls
- **What is occurring in Tennessee is happening on a regional and nation-wide level.**
  - Shift to inexpensive and cleaner natural gas
  - Increase of renewable energy
  - Decrease in energy demands due to retrofits and upgrades

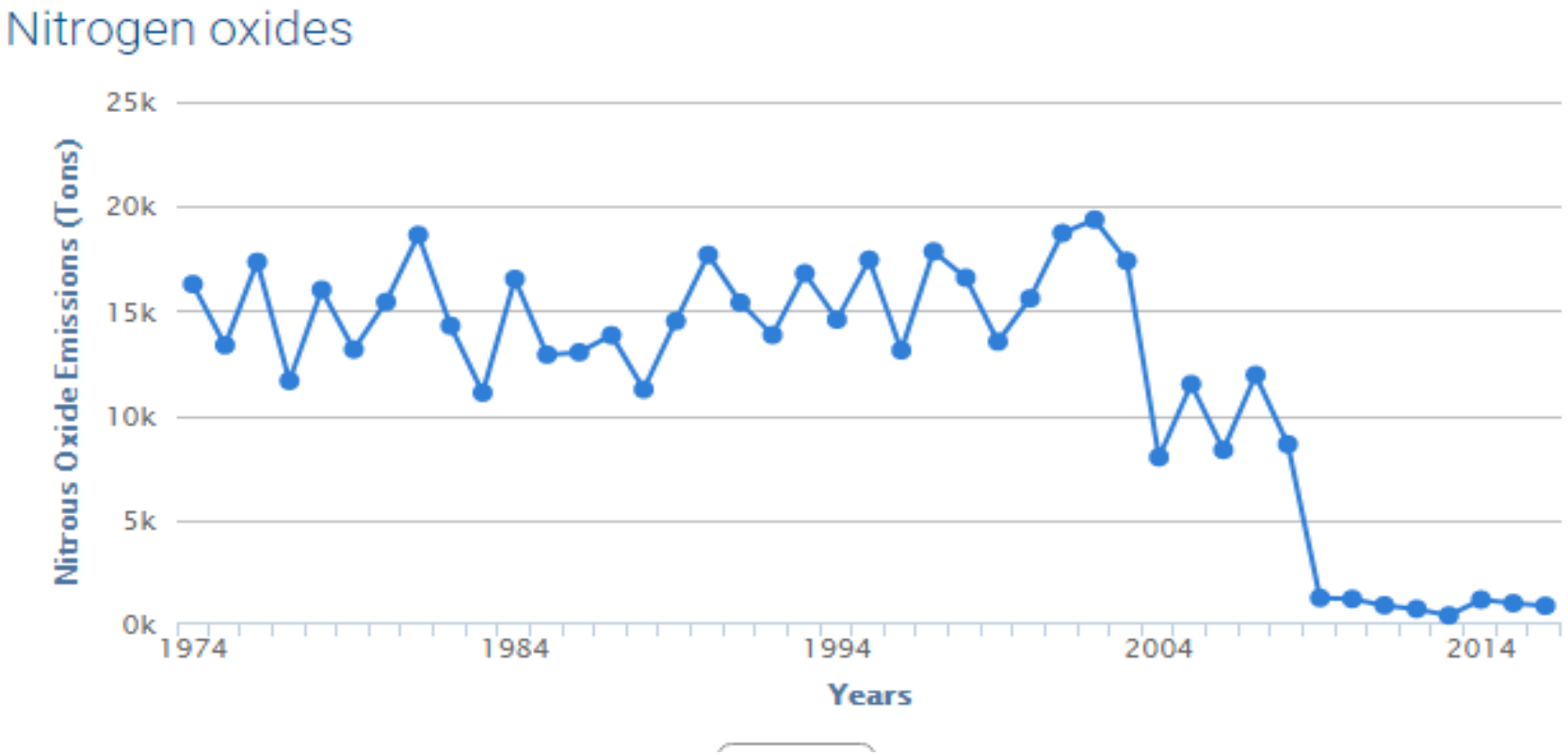
Example of Coal Plant Emission Controls

- TVA Bull Run Sulfur Dioxide Emissions



Example of Coal Plant Emission Controls

- TVA Bull Run Nitrogen oxides Emissions



Clean Tennessee Energy Grant – 2011-2017

- A less publicized part of the TVA Settlement was a $26.4 million payment to fund for energy reduction and air quality improvement projects.
- Renewable Energy, Energy Conservation, and Air Quality Improvements throughout the State. Estimated reduction in energy demands of 33.6 million kWh.
- Examples of Projects –
  - Numerous solar power arrays installed
  - Numerous LED retrofits and HVAC upgrades in municipal buildings and State colleges.
  - East Tennessee State - Replaced 3 coal fired boilers with natural gas.
  - Electrical upgrade and pump modernization to many municipal wastewater plants. Large reduction in energy usage.

Enhanced Awareness of Air Quality Issues

- **The Irony –**
  - $600 Million Google Data Center in Alabama on former TVA Widows Creek coal-fired plant site.
  - TVA is partnering with Google to ensure that the facility is powered by 100% clean, renewable energy.

- **Corporate and Citizen Awareness –**
  - Corporations and manufactures are making demands of states and utilities to provide clean energy options.
  - Citizens are not only adapting to, but demanding LEED-certified homes, apartments and offices.
  - Builders, developers and utilities continue to adapt to the energy saving demands of the customers.

The Future

Volkswagen Settlement

- **TN's initial allocation based on the 2.0 and 3.0 liter partial settlements is $45,759,914.**
  - TDEC has been identified by Tennessee Governor Bill Haslam as the Lead Agency for purposes of administering Tennessee's trust allocation.
  - A Beneficiary Mitigation Plan developed to show TN's goals for the use of the funds. The Plan development included extensive TDEC/APC research as well as public comment and a series of public information sessions.
  - Full details of TDEC's Volkswagen Settlement activities and plans can be found on the VW Settlement webpage.
  - The money can be used for repowering of diesel engines to natural gas, electric or clean diesel for bus fleets, freight trucks, ferries, tugs, airport ground vehicles and other diesel vehicles.

Vehicle Emissions Program

- Annual testing is viewed by many as a nuisance for all, and financial burden for person's who can't afford new vehicles or repairs.
- Recent Legislative History –
  - 2016 – 3 model year exemption for new vehicles passed.
  - 2017 – Numerous bills to change the I/M program. Momentum for change quickly morphed into momentum for elimination.
    - Signed legislation eliminates the I/M program following completion and EPA approval of APC's Noninterference Demonstration.
    - APC to submit a State Implementation Plan revision that shows impacts of the elimination of the I/M program.
    - Davidson County has the option of continuing their program.

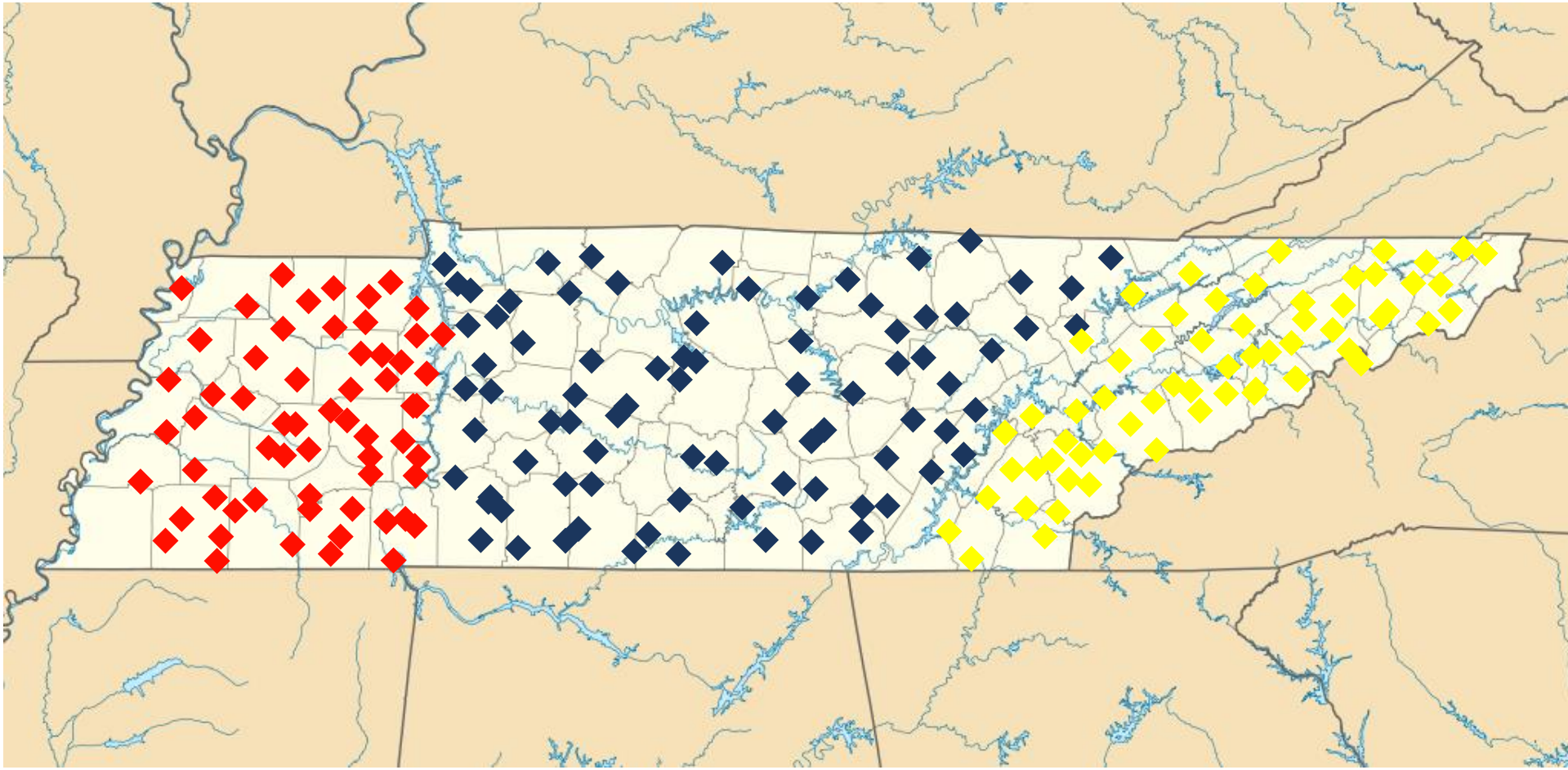
Growth of APC Collaboration

- **APC is reaching out to work in collaboration with other agencies to achieve mission goals.**
  - **Office of Energy Planning** - APC providing technical analysis for mitigation options for the Volkswagen Settlement funds.
  - **Dept. of Health** – APC is working with the Dept. of Health on data collection and analysis of health benefits of cleaner air.
  - **Division of Solid Waste** – permitting staff is working with Solid waste to coordinate regulatory goals, site inspections and site operation.
  - **Office of Policy and Sustainable Practices** – APC is providing technical guidance and opinions on policies relating to air quality issues.
  - **Dept. of Transportation** – collection and analysis vehicle data for I/M program and transportation conformity.
  - **Dept. of Economic & Community Development** – APC provides proactive permitting guidance to companies relocating to TN.

Changes to the Permitting Program

- **Efforts to streamline and increase efficiency and consistency of the permitting process.**
  - **Construction Permit LEAN Process**
    - Standardization of permits format
    - Updated forms and form guidance on web-site
    - Application checklist
    - Standardization of internal and external review process
  - **New Minor Source Permitting Programs**
    - General Permits
    - Permits-by-Rule
    - Combined Construction & Operating Permits (Pilot Stage)
  - **Sector-Based Permitting**
    - Eliminate arbitrary geographic limitations
    - Increase level of expertise within APC

Old System - Geographic-Based Permitting



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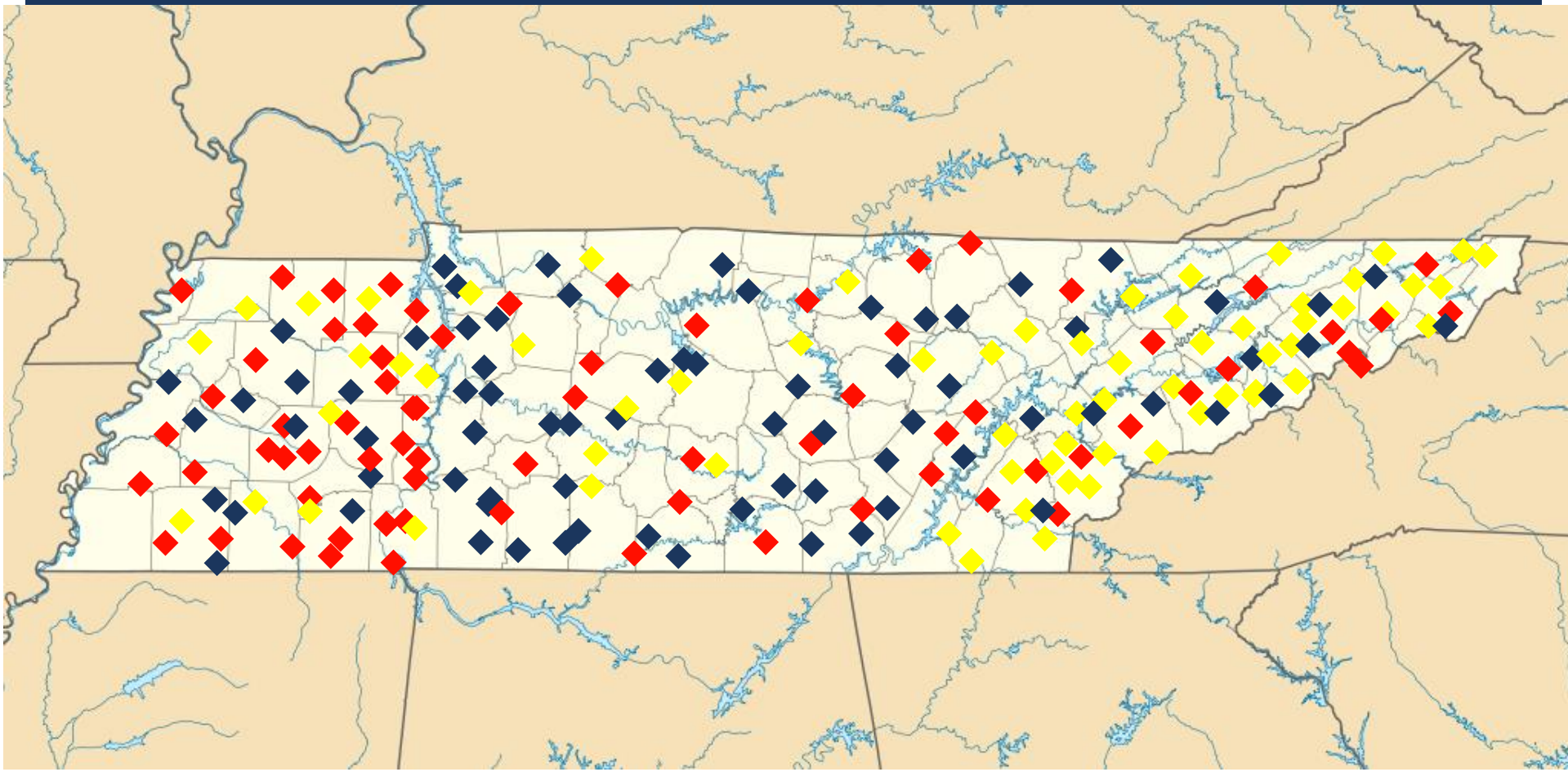
New System - Sector-Based Permitting



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SLEIS - Upgrade to Data Reporting

- APC is implementing the Sate & Local Emission Inventory System (SLEIS). SLEIS is an on-line emissions reporting system to collect, manage, review, and report emissions data. SLEIS is currently used by 20 states.
  - User Account access to facility personnel and approved-consultants
  - Facility specific configuration of emission units and release points
  - APC has developed a spreadsheet tool for facilities to submit required emission data for uploading into SLEIS.
  - Will eventually be the portal for on-line submittal of Title V annual and semi-annual reports.
- SLEIS has simplified the data management and reporting process to meet EPA's National Emission Inventory (NEI) requirements .

APC Management Changes

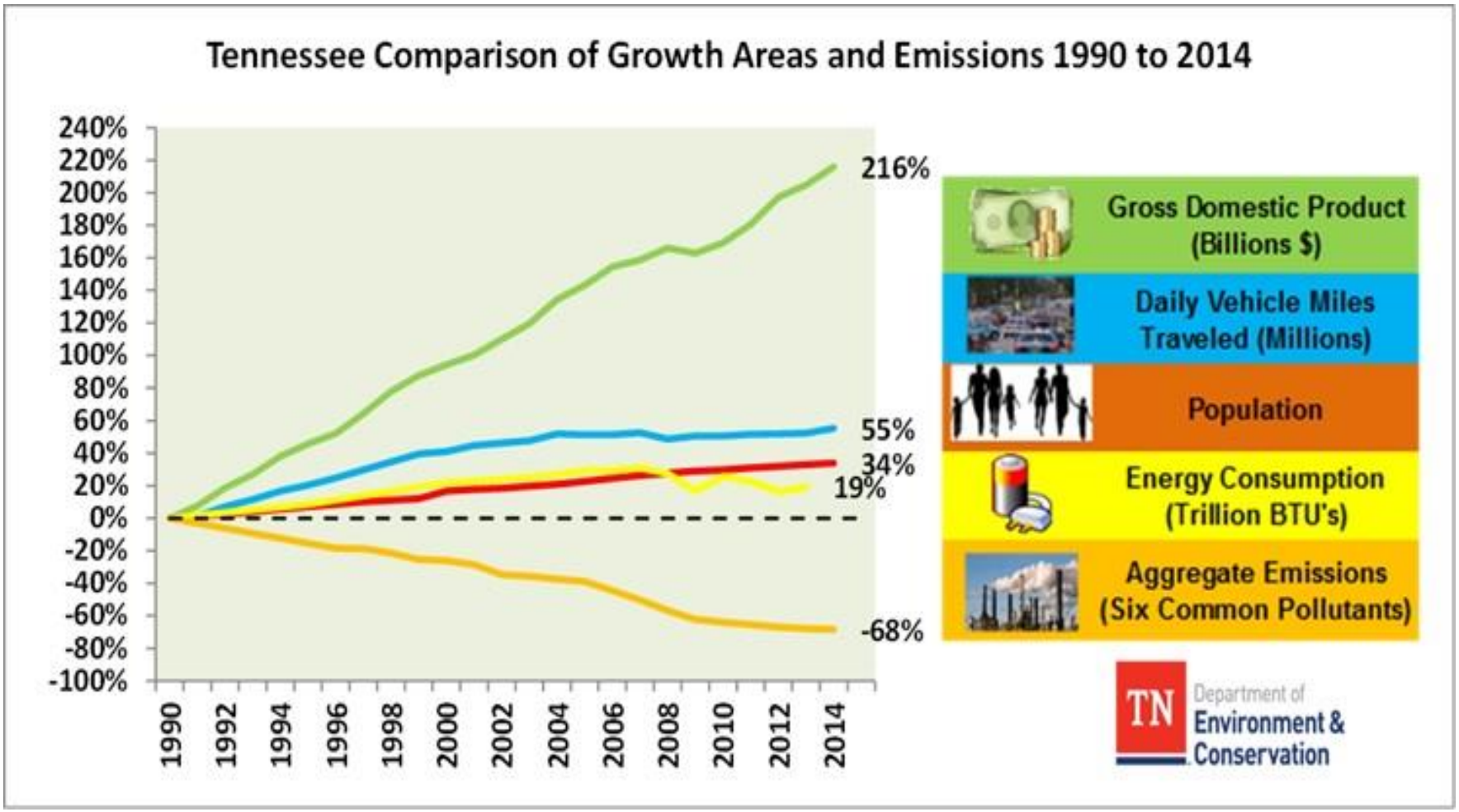
- **Deputy Director Quincy Styke III retiring in July**.
  - **Alvin Pratt** will be the new Deputy Director for Environmental Measurements and Compliance Assurance. Alvin has been with APC for over 30 years and currently manages the Compliance Validation Program.
- **Reporting to Alvin Pratt will be:**
  - **Brad King** as the Manager of Technical Services Program and,
  - **Dr. Michelle Oakes** as the Manager of the newly established Quality Assurance program.

- **Doug Wright** has been promoted to Permitting Manager and will be leading one of the four sector based permitting groups.

Project Restore – Statewide Monitoring System

- **The purpose of Project Restore is to**:
  - Update aging and obsolete monitoring equipment
  - Restore or relocate existing sites to meet siting criteria in Federal Regulations.
  - Upgrade monitoring shelters to meet tighter regulatory constraints and eliminate safety concerns. "Newest" shelter is 22 years old.
  - New shelters are made specifically for air monitoring with proper temperature/humidity control and ventilation.
- The $PM_{2.5}$ network has been fully upgraded. New Lead monitors are being purchased. New Ozone and SO_2 monitors and calibrators have been purchased.
- The first new monitoring shelter is scheduled for install in June. 10 new shelters are expected by the end of December 2018.

APC Mission in Graphical Form



Questions?